

**Amendments to the Drawings:**

The attached sheet of drawings includes changes to Figure 1. The sheet, which includes Figure 1, replaces the original sheet. Specifically, original Figure 1 as filed includes reference numeral 39, which points to two different elements: a mating latch plate and machine screws. In Figure 1, reference numeral 39 incorrectly points to the machine screws (shown at the corners of heater element 30). Here, Figure 1 is amended to replace reference numeral 39 pointing to the machine screws with elements 32a, which correctly refers to machine screws 32A in the specification as filed.

A marked-up version of the drawings, with revisions shown in red, is included with the amended drawings. Entry of the amended drawings is respectfully requested.

Attachment: Replacement Sheet  
Annotated Sheet Showing Changes

REMARKS

Applicants note with appreciation that claims 9, 10, 32, and 33 are allowable if rewritten in independent form. Accordingly, new claim 62 is claim 9 rewritten in independent form, new claim 63 is claim 10 rewritten in independent form, new claim 64 is claim 32 rewritten in independent form, and new claim 65 is claim 33 rewritten in independent form.

Applicants note that claim 33 is amended to correct a clerical error, that is, claim 33 is amended to be dependent on claim 31. New claim 65, which includes the limitations of claim 33, also includes the limitations of intervening claim 31, in view of the amendment made to claim 33. Allowance of new claims 62-65 is respectfully requested.

Figure 1 of the drawings is amended to correct clerical errors. Specifically, reference numeral 39 shown in original Figure 1 points to machine screws at the corners of heater plate 32, as well as to a mating latch plate, which abuts a quick-release mount plate 38. Reference numerals 39 at the corners of heater element 30 are removed, and replaced with reference numerals 32A. Reference numeral 39 at the bottom of Figure 1 properly refers to a mating latch plate. Entry of the amendments to the drawings is respectfully requested.

Claims 37-43 are rejected under 35 U.S.C. 112, second paragraph, for reasons stated in the Office Action at page 2. Claim 37 is canceled above. Claims 38, 40, and 43 are amended to be dependent on claim 22. Reconsideration of the objections of claims 37-43 is therefore respectfully requested.

Claims 1-8, 11-31, and 34-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isogai, *et al.* (hereinafter “Isogai”). Reconsideration is respectfully requested.

Independent claim 1 is amended herein to clarify that a “material dispense pump” comprises a “pump body including a mounting location” at which a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body.” In addition, independent claim 1 is amended herein to clarify that a “pump body heater” “generates heat by resistive heating,” the “pump body heater in direct thermal contact with, the pump body to apply the heat to the pump body and cartridge.”

Independent claim 22 is amended herein to clarify that a “material dispense pump” comprises “pump body including a mounting location at which” a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body.” In addition, independent claim 22 is amended herein to clarify that a “material dispense pump” comprises a “material reservoir heater in thermal communication with a material reservoir containing material to be dispensed to apply heat to the material in the material reservoir,” wherein “the material reservoir heater includes a first temperature control system and the pump body heater includes a second temperature control system, wherein the first and second temperature control systems operate independently of each other to control the temperature of the pump body and cartridge and the temperature of the material in the material reservoir, respectively.”

Independent claim 44 is amended herein to clarify that a “method for controlling a material dispense pump” comprises “controlling the temperature of a pump body, the pump body formed of thermally conductive material and having a pump cartridge formed of thermally conductive material, the pump cartridge having an auger screw driven by a motor for dispensing material, the pump cartridge being in thermal communication with the pump body, the pump body including a mounting location at which the pump cartridge having the auger screw is inserted into and removed from the pump body.” In addition, independent claim 44 is amended herein to clarify that a “method for controlling a material dispense pump” comprises “controlling the temperature of a material reservoir containing material to be dispensed by the pump cartridge, wherein controlling the temperature of the pump body and controlling the temperature of the material reservoir are independent of each other.”

Independent claims 56, 58, and 60 are amended herein to clarify that a “material micro-dispense pump” comprises a “pump body including a mounting location” at which a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body.” In addition, independent claims 56, 58, and 60 are amended herein to clarify a “pump body heater” that “generates heat by resistive heating,” the “pump body heater in direct thermal contact with the pump body to apply the heat to the pump body and cartridge.”

With regard to the rejection of claim 1 based on Isogai, it is submitted that Isogai fails to teach or suggest a “material dispense pump” comprising a “pump body including a mounting location” at which a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body,” as claimed in amended independent claim 1. Instead, Isogai teaches a screw 214 in a screw chamber 210, the screw chamber being open in a lower axial end face 212 of a pump housing 180 (see Isogai, Figure 3 and column 14, lines 17-25). There is no teaching or suggestion in Isogai of the pump housing 180 being a “pump cartridge” having an “auger screw” that is “inserted into and removed from” a “pump body,” as claimed in amended independent claim 1. In fact, there is no teaching or suggestion in Isogai of z-axis slide 70 of Isogai (referred to in the Office Action as a “pump body”) including a “mounting location” at which a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body,” as claimed in amended independent claim 1. The pump housing 180 is enclosed in the device of Isogai in a manner that prevents the pump housing 180 from being “inserted into and removed from” a “pump body,” as claimed in amended independent claim 1. Specifically, the pump housing 180 of Isogai is prevented by a sleeve 124 from having a “mounting location,” such that the pump housing 180 cannot be “inserted into and removed from” the z-axis slide 70.

In addition, it is submitted that Isogai fails to teach or suggest “a pump body heater that generates heat by resistive heating, the pump body heater in direct thermal contact with the pump body to apply the heat to the pump body and cartridge,” as claimed in amended independent claim 1. Instead, Isogai teaches a heating device 296 that generates hot air similarly to that disclosed in the Background section of the specification as filed. Specifically, the heating device 296 of Isogai controls the temperature of compressed air that is introduced into an air passage 294, and blown onto a portion of a pump housing 180 to heat an adhesive agent within a screw chamber 210 and delivery nozzle 90 (see Isogai, Figure 3 and column 16, lines 50-65). However, there is no teaching or suggestion in Isogai of the heating device 296 being “a pump body heater that generates heat by resistive heating, the pump body heater in direct thermal contact with the pump body to apply the heat to the pump body and cartridge,” as claimed in amended independent claim 1. Specifically, the heating device 296 of Isogai (shown in the bottom of Figure 3 of Isogai) is separated from the z-axis slide 70 (referred to in the Office

Action as a “pump body,” and shown at the top of Figure 3 of Isogai) by several components, such as an air supply body 292 and a sleeve 124. There is no teaching or suggestion in Isogai of the heating device 296 being in “direct thermal contact” with the z-axis slide 70. Further, there is no teaching or suggestion in Isogai of the heating device 296 generating “resistive heating,” as claimed in claim 1.

The Office Action at pages 2-3 asserts that it would have been obvious to one of ordinary skill in the art easily place a resistive heater on a specific area to heat. Applicants respectfully disagree with this assertion. In particular, as described above, there is no teaching or suggestion in Isogai of a “pump body heater” that “generates heat by resistive heating,” as claimed in claim 1. The only reference in Isogai of a heating device is the abovementioned heating device 296, which does not teach or suggest generating heat by “resistive heating,” and is not in “direct thermal contact with” a “pump body” to “apply the heat to the pump body and cartridge,” as claimed in amended independent claim 1. One of ordinary skill in the art understands that “resistive heating,” also referred to by those of ordinary skill in the art as “Joule heating,” “ohmic heating,” or “electric heating,” involves the passage of an electric current through a conductor to release heat. However, while the heating device 296 of Isogai raises the air temperature in an air passage 294 (see Isogai, column 16, lines 50-52), there is no teaching or suggestion in Isogai that the heating device 296 performs “resistive heating,” as claimed in claim 1.

In addition, it submitted that Isogai fails to teach or suggest a “motor mount comprising a thermally insulating material” that “thermally insulates” a “motor” from a “pump body,” as claimed in claim 1. The Office Action at page 2 asserts that one of ordinary skill would provide an insulating material anywhere on a dispensing device in order to make the device easier to handle and prevent unwanted heating of the surrounding parts. However, while Isogai teaches a motor 240, there is no teaching or suggestion in Isogai of a “motor mount,” that thermally isolates a “motor” from a “pump body,” as claimed in claim 1. Further, in the present invention as claimed in claim 1, the “motor mount” comprises a “thermally insulating material” that “thermally insulates” a “motor” from a “pump body,” in order to minimize heat exchange between the respective bodies (see page 10, lines 16-18 of the specification as filed). The

purpose for thermally insulating a motor from a pump body, as claimed in claim 1, and thereby minimizing heat exchange between the motor and the pump body, is to prevent heat from being drawn into the pump body from the motor, or, conversely, to prevent heat from being permitted to escape from the pump body, and be drawn to the motor, which could affect temperature control of the pump body and cartridge (further details on temperature control of the present invention are described below). This thermal insulation results in the pump body being thermally isolated from external components that generate heat, such as a motor, for example, motor 54 shown in Figure 1 of the drawings as filed, or a syringe heater, such as syringe heater 102 shown in Figure 3 of the drawings as filed. As a result, enhanced closed-loop temperature control of the pump body can be achieved.

With regard to the rejections of amended independent claims 56, 58, and 60, it is submitted that Isogai fails to teach or suggest a “material micro-dispense pump” comprising a “pump body including a mounting location” at which a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body,” as claimed in amended independent claims 56, 58, and 60, for reasons described above with regard to amended independent claim 1.

In addition, it is submitted that Isogai fails to teach or suggest a “material micro-dispense pump” comprising a “pump body heater” that “generates heat by resistive heating,” the “pump body heater in direct thermal contact with the pump body to apply the heat to the pump body and cartridge,” as claimed in amended independent claims 56, 58, and 60, for reasons described above with regard to amended independent claim 1.

In addition it is submitted that Isogai fails to teach or suggest a “material micro-dispense pump” comprising a “motor mount that mounts the motor to the pump body, the motor mount comprising a thermally insulating material that thermally insulates the motor from the pump body,” as claimed in claims 56, 58, and 60, for reasons similar to those described above with regard to claim 1.

In addition, with regard to the rejection of independent claim 56 based on Isogai, it is submitted that Isogai fails to teach or suggest a “pump cartridge having an auger screw driven by the output axle of the motor for dispensing material and a material feed aperture that is elongated

with respect to the primary axis of the auger screw at which material to be dispensed is introduced to the auger screw at least at a side of the auger screw,” as claimed in independent claim 56. Isogai teaches a supply passage 262 that extends to an upper end portion of the screw chamber 210 (see Isogai, Figures 3-4 and column 15, lines 43-45). However, there is no teaching or suggestion in Isogai of a “material feed aperture” at a location where the supply passage 262 is connected to the upper end portion of the feed screw chamber 210 that is “elongated” with respect to the primary axis of the screw 214 in the screw chamber 210.

With regard to the rejection of independent claim 22 based on Isogai, it is submitted that Isogai fails to teach or suggest “a material reservoir heater in thermal communication with a material reservoir containing material to be dispensed to apply heat to the material in the material reservoir, wherein the material reservoir heater includes a first temperature control system and the pump body heater includes a second temperature control system, wherein the first and second temperature control systems operate independently of each other to control the temperature of the pump body and cartridge and the temperature of the material in the material reservoir, respectively,” as claimed in amended independent claim 22.

Specifically, there is no teaching or suggestion in Isogai of a “material reservoir heater,” as claimed in amended independent claim 22. Instead, as described above, the only heater mentioned in Isogai is the heating device 296, which controls an air temperature of air introduced into an air passage that is blown onto a portion of a pump housing 180 (see Isogai, column 16, lines 42-60). While Isogai teaches a container 250, there is no teaching or suggestion of the heating device 296 being a “material reservoir heater” in “thermal communication with” the container 250 that contains “material to be dispensed” to “apply heat to the material in” the container 250. Further, although Isogai teaches heating material in a screw chamber 210 and a delivery nozzle 90 (see Isogai, Figure 3 and column 16, lines 61-65), nowhere does Isogai teach or suggest a “material reservoir heater” that applies “heat to the material in the material reservoir,” as claimed in claim 22.

Further, since Isogai fails to teach or suggest a “material reservoir heater,” as claimed in claim 22, it follows that Isogai fails to teach or suggest a “material reservoir heater” that includes

a “first temperature control system” and a “pump body heater” that includes a “second temperature control system,” wherein “the first and second temperature control systems operate independently of each other to control the temperature of the pump body and cartridge and the temperature of the material in the material reservoir, respectively,” as claimed in amended independent claim 22. In particular, there is no teaching or suggestion in Isogai of the heating device 296 including both a “first temperature control system” and a “second temperature control system,” as claimed in amended independent claim 22. Further, the only reference in Isogai to controlling a temperature is in regard to controlling the temperature of adhesive agent in the screw chamber 210 and delivery nozzle 90 by a single temperature control device 290, and controlling the temperature of the air in the air passage 294 (see Isogai, Figure 3, column 16, lines 21-24, column 17, lines 4-11, and column 20, lines 14-20).

In addition, it is submitted that Isogai fails to teach or suggest “material dispense pump” comprises “pump body including a mounting location at which” a “pump cartridge” having an “auger screw” is “inserted into and removed from the pump body,” as claimed in amended independent claim 22, for reasons similar to those described above with regard to claims 1, 56, 58, and 60.

With regard to the rejection of amended independent claim 44 based on Isogai, it is submitted that Isogai fails to teach or suggest “controlling the temperature of a pump body, the pump body formed of thermally conductive material and having a pump cartridge formed of thermally conductive material, the pump cartridge having an auger screw driven by a motor for dispensing material, the pump cartridge being in thermal communication with the pump body, the pump body including a mounting location at which the pump cartridge having the auger screw is inserted into and removed from the pump body,” as claimed in claim 44, for reasons similar to those described above with regard to independent claims 1, 22, 56, 58, and 60.

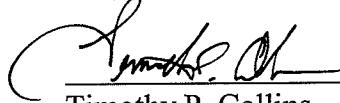
In addition, it is submitted that Isogai fails to teach or suggest “controlling the temperature of a material reservoir containing material to be dispensed by the pump cartridge, wherein controlling the temperature of the pump body and controlling the temperature of the

material reservoir are independent of each other," as claimed in amended independent claim 44, for reasons similar to those described above with regard to independent claim 22.

Accordingly, since Isogai does not teach or suggest all of the claim limitations set forth in independent claims 1, 22, 44, 56, 58, and 60, it follows that Isogai does not establish *prima facie* obviousness under 35 U.S.C. 103, as described in the Manual of Patent Examining Procedure (MPEP) at section 2143.03. Reconsideration and removal of the rejections of claims 1-8, 11-31, and 34-61 under 35 U.S.C. 103(a) based on Isogai are respectfully requested.

In view of the amendments to the claims and the foregoing remarks, it is believed that all claims pending in the application are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

  
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